

Patent claims

1. Injector, in particular fuel injection valve of motor vehicles, with a piezoelectric actor body (1), especially in a multilayer design, of which the jacket surface is surrounded by an injector housing (9), maintaining an intermediate space and is cooled by direct contact with an inert fluid which does not conduct electricity.

characterized in that in the injector housing (9) a fluid space is formed filled with a heat coupling fluid (6) except for an air reservoir (7), whereby the actor body (1) is in direct contact with the fluid (6) over at least part of its length which removes the actor heat in a lateral direction from the actor body (6) and whereby the volume of the air reservoir (7) is at least as large as to allow the expansion of the heat coupling fluid (6) which occurs at the highest operating temperature of the actor body (1).

2. Injector according to Claim 1, characterized in that the space forms at least a part of the fluid area and is filled over at least part of its length with the fluid (6) and that in the injector housing (9) a separation facility (5) is provided in the area of the valve-side end of the actor housing (1) so that it seals the fluid-filled part of the fluid space against a space adjacent to the injector valve (V) in the injector housing (9).

3. Injector according to Claim 2, characterized in that the actor body (1) is incorporated into a tubular spring (2) located in the space and is pretensioned by this, whereby the fluid (6) forms a heat conducting bridge through the openings of the tubular spring (2) between the actor body (1) and the injector housing (9).

4. Injector according to Claim 1,  
characterized in that the actor body (1) is incorporated into an axial  
encapsulation (14) positioned in the space which divides the space into  
5 an actor internal space and an actor external space (17) hydraulically  
sealed against it, whereby the actor internal space forms at least a part  
of the fluid space and is filled with fluid (6) over at least a part of  
its length

10 5. Injector according to Claim 4,  
characterized in that the actor external space (17) is filled over at  
least a part of its length with a second heat coupling fluid (6).

6. Injector according to Claim 5,  
15 characterized in that a dynamic hydraulic bearing (16) rigidly supporting  
the actor body (1) on the side away from the valve needle (V) is pro-  
vided, that the hydraulic support (16) and actor external space (17) are  
hydraulically connected and are filled with a hydraulic liquid serving as  
a second heat coupling fluid, and that a sealing element (5) is provided  
20 in which the actor external space (17) is sealed against a space adjacent  
to the injector valve (V) in the injector housing (9).

7. Method in accordance with one of the Claims 4 to 6,  
characterized in that the encapsulation is formed by an axially flexible  
25 metal bellows (14) and that the actor body (1) is pretensioned by this.

8. Method in accordance with one of the Claims 1 to 7,  
characterized in that the actor body (1) is in direct contact with the  
fluid (6) over its entire length and that the volume of the air reservoir

(7) is connected without any hydraulic restriction with the fluid-filled part of the fluid space.

5 9. Injector according to Claim 8,  
characterized in that an elastic membrane is provided between the air reservoir (7) and the fluid-filled part of the fluid space.

10. Method in accordance with one of the Claims 1 to 9,  
10 characterized in that the injector housing (9) features holes for the electrical connecting leads (15) of the actor and that at least one of these holes is provided as a filling channel (18) for the fluid space.

11. Method in accordance with one of the Claims 1 to 10,  
15 characterized in that a heat coupling fluid (6) with a high dielectric constant is provided.